PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 10319.204-WO	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/DK 03/00851	International filing date *(day/month/year)* 11.12.2003	Priority date *(day/month/year)* 20.12.2002
International Patent Classification (IPC) or both national classification and IPC C12N9/38		
Applicant NOVOZYMES A/S et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
18.03.2004	10.02.2005
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Steffen, P Telephone No. +49 89 2399-7307

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/DK 03/00851

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-33 as originally filed

Claims, Numbers

1-28 as originally filed

Drawings, Sheets

1/174-174/174 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☒ furnished subsequently to this Authority in written form.

☒ furnished subsequently to this Authority in computer readable form.

☒ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☒ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

☐ the description, pages:

☐ the claims, Nos.:

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1-28
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-28
Industrial applicability (IA)	Yes:	Claims	1-28
	No:	Claims	

2. Citations and explanations

   see separate sheet

Re Item V

Reasoned statement under Article 35(2) PCT with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1: RYTTERSGAARD C ET AL: "Crystallization and preliminary X-ray studies of beta-1,4-galactanase from Aspergillus aculeatus" ACTA CRYSTALLOGRAPHICA SECTION D BIOLOGICAL CRYSTALLOGRAPHY, vol. 55, no. 4, April 1999 (1999-04), pages 929-930, XP002279559 ISSN: 0907-4449

D2: BRAITHWAITE K L ET AL: "Evidence that galactanase A from Pseudomonas fluorescens subspecies cellulosa is a retaining family 53 glycosyl hydrolase in which E161 and E270 are the catalytic residues." BIOCHEMISTRY. UNITED STATES 9 DEC 1997, vol. 36, no. 49, 9 December 1997 (1997-12-09), pages 15489-15500, XP002279560 ISSN: 0006-2960

D3: WO 97/32014 A (KAUPPINEN MARKUS SAKARI ;NOVONORDISK AS (DK); ANDERSEN LENE NONBOE) 4 September 1997 (1997-09-04)

D4: WO 00/47711 A (NOVONORDISK AS) 17 August 2000 (2000-08-17)

The present claims are directed towards variants of a parent glycoside hydrolase family 53 galactanase that comprises an alteration (insertion, substitution, deletion) in at least one out of a big number of positions. Several other embodiments linked to these variants are also claimed. More specifically, the parent galactanase can be from Myceliophthora thermophila, Humicola insolens, Aspergillus aculeatus or Bacillus licheniformis. The positions to be exchanged are deduced according to differences in the sequence alignment of the above enzymes and can functionally belong to several families such as pH optimum, temperature optimum etc...

The claims are presently formulated in a manner that the wild-type parent galactanases as disclosed in D1-D4 are encompassed too. For example the family 53 galactanase of M. thermophila can be seen as a variant of the one of H. insolens having at least one alteration as proposed in the claims, say V13L. The same is true for all other galactanases proposed and all the positions differing. Moreover does D2 disclose a galactanase variant that has activity and in which there is the substitution E161A compared to the wild-type enzyme

(corresponding to the substitution E135A of claims 1-3 among others).

In conclusion, the variants claimed are not novel compared to D1-D4 and all other embodiments are equally anticipated by these documents. Hence the present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-28 is not new in the sense of Article 33(2) PCT and thus also does not involve an inventive step in the sense of Article 33(3) PCT.

Other matter

a) Clarity, article 6 PCT.

The numbering system of the variant positions in the claims is completely obscure. It is based on a specific sequence alignment e.g. claim 19 and it does not refer to equivalent positions but to absolute positions. It is for example noted that position -6 is inexistent in M. thermophila galactanase and that other positions are not equivalent. Also the small letter numbering such as position 302o or 302gg for example is not familiar in the art but used only for the purpose of the present application. Such is also the designation with a *. Claims to be clear, need to be self-sufficient and must not rely on long, and with regard to a meaning in the art, unusual explanations in the description (Article 6 and Rule 6 PCT).

b) Unity of invention, Article 34(3)(a) and Rules 13.1 and 13.2 PCT.

With regard to the variants in the claims of different parent galactanases e.g. derivable from Myceliophthora thermophila, Humicola insolens, Aspergillus aculeatus or Bacillus licheniformis and with regard to the positions to be exchanged belonging functionally to several families such as amended specific activity, amended activity on lactose, pH activity profile thermostability etc.., with regard also to the lack of novelty of a big number of claimed variants, the question of unity of invention arises. The applicants are made aware of the fact that in the various regional/national phases of the present international application, division of the claimed subject-matter may be asked for.

c) Request for early start of IPE (letter of 16.03.2004)

Early start of IPE for the present application under Rules 69(1)(a) and 54bis.1(a) PCT (version 2004) is/was not possible as this provision is only applicable for international applications filed on or after 01.01.2004 and the present application was filed on 11.12.2003.

Please see http://www.wipo.int/pct/en/meetings/assemblies/reports.htm, thirty-first (18th Extraordinary Session of PCT Assembly, September 23 - October 1, 2002).

Hence the PCT regulations in force at that date of filing are relevant and Rule 69.1(a) PCT stipulates that the IPEA starts IPE once it is in possession of the demand and the ISR e.g. on or after 03.06.2003 provided that Rule 69.1(b) PCT did not apply, which was manifestly not the case here.